Intercity Bus Transportation System and its competition in Malaysia

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Abstract: Intercity transportation in Malaysia is quite similar to other countries, which involve three kinds of modes, namely, bus, rail and air. Among these modes, bus transportation continues to be the top choice for intercity travelers in Malaysia. Bus offers more flexibility compared to the other transport modes. Due to its relatively cheaper fare as compared to the air transport, bus is more affordable to those with low income. However, bus transport service today is starting to face higher competition from rail and air transport due to their attractive factors. The huge challenge faced by intercity bus transport in Malaysia is the management of its services. The intercity bus transport does not fall under one management; unlike rail transport which is managed under Keretapi Tanah Melayu Berhad (KTMB), or air transport which is managed under Malaysia Airports Holdings Berhad (MAHB). This paper discusses the competition between intercity buses and other modes.
Key Words*: Intercity bus transport, intercity modes, feeder transport*

1. INTRODUCTION

Malaysia is a federation formed in 1963 comprising of 13 states and 3 federal territories. It is located between 1° and 7° degrees north of the Equator with an area of 329,758 sq. km. Malaysia is a tropical country, with warm and humid weather all year round. The temperature ranges from 21°C to 32°C. The annual rainfall varies from 2,000 mm to 2,500 mm. The 13 states are Johor, Kedah, Kelantan, Malacca, Negeri Sembilan, Pahang, Perak, Perlis, Penang, Selangor, Terengganu, Sabah and Sarawak while the three federal territories are Kuala Lumpur, Labuan and Putrajaya. The country consists of two geographical regions which are separated by the South China Sea.

The region located on the west side is well-known as Peninsular Malaysia and shares a land border on the north with its northern neighbor, Thailand. It is connected by the Johor-Singapore causeway and the Malaysia-Singapore second link on the south with its southern neighbor, Singapore. The other region is called East Malaysia which occupies the northern part of the island of Borneo, bordering Indonesia and the Sultanate of Brunei. It consists of the federal territory of Labuan island and the states of Sabah and Sarawak.

The road transportation sector in the country caters approximately 96% of total passenger and goods transport. Malaysia has a road network infrastructure of 90,129 km of which 79% are paved (year 2006). A total of 1,890 km highways are in operation comprising mostly of interurban highways. The Malaysian government believes that economic growth is able to bring prosperity and better quality of life to all segments of society. In this respect, the principle of "growth with equity" has been highlighted in all development efforts since the 1970s, which had contributed to a significant reduction in the incidence of poverty and a more equitable distribution of income. Comprehensive planning for roads in the country began in the First Malaysia Plan (1966-1970). During the Seventh Malaysia Plan (1996-2000), the overall development of roads is guided by the Highway Network Development Plan that was formulated in 1993.

The total population in 2009 is 28.31 million and population density is 86/sq. km. Life expectancy is 74.1 years (71.8 years for males, and 76.2 years for females). The infant mortality rate is 9.0 per 1,000 live births (2005). Adult literacy rate is over 88%. The national census revealed that 50.4% of the population are Malays and 23.7% are Chinese. The rest comprised of indigenous peoples (11%), Indians (7.1%) and other ethnicities (7.8%). Around 62.7% of the population is in working age (i.e. between the ages of 15-64). Males comprise 50.7% of the population, while females comprise 49.3%. Malaysian income per capita is 6,812 U$D (2009) or RM 24,541 which allows it to be classified as a middle-income country.

2. INFRASTRUCTURE FOR INTERCITY TRANSPORT

Intercity transportation in Malaysia is served by three modes of transportation, namely, air transport, rail transport and intercity bus transport.

2.1 Roads Network and Intercity Bus transportation system

The road network in Malaysia has expanded by almost 8,100 km, from only 41,000 km in 1990 to slightly over 49,000 km in 2000. One of the most important component of the country's road system is the 864 km North-South Expressway (NSE), which stretches from Bukit Kayu Hitam on the Thai border to Johor Bahru in the South of Peninsular Malaysia.

All major economic centers are linked to one another and have good connection to the ports by good road networks. The rural and outlying areas are also connected to the main inter-urban road grid. The federal and state roads in this country together with the privatized roads thus form an extensive and nation-wide road system for Peninsular Malaysia.

The average speeds of the vehicles on the major roads are quite high due to the relatively high geometric characteristics. However, the speed limit for motorcars is between 90 to 110 kilometers per hour; while for buses and trucks, the range is 80 to 90 kilometers per hour.

With the growing and booming local automobile industry, the automobile population in Kuala Lumpur has been rapidly increasing over the recent years. Subsequently, the significant effect is the increase number of vehicle ownership. This can be seen by looking at the number of vehicles owned per household in Malaysia. Based on the authors' point of view, a family unit on average possesses two or three cars. Coupled with the declining use of public transport this situation results in road congestion and high parking demand especially in the city. The government has made significant investment to keep planning and constructing roads to cope with the problem. On the other hand, public transport infrastructure also has to be improved as it can be seen as the best way to solve the traffic congestion problem. In order to encourage people to choose public transport, the infrastructure has to be improved to reach the satisfaction level among the passengers.

Until a few months ago, the main intercity bus terminal in Kuala Lumpur area was Puduraya intercity bus terminal, supported by intercity bus terminal of Shah Alam, Duta terminal and Bus Terminal of Kajang. After the government planned to change Puduraya terminal to be the urban public transport terminal, all the activities in Puduraya were moved to the Bukit Jalil Sport Center area.

Starting on January 2010, intercity passenger movement will be served by an integrated transportation terminal of Bandar Tasik Selatan for the southern corridor of Malaysia. Later in 2012, the Integrated Transport Terminal of Gombak will serve the intercity passenger movement to the northern and eastern corridor.

The main intercity passenger movement in Malaysia can be observed in Table 1.

Table 1 : Intercity bus destination in Malaysia

DIRECTION OF COACHES	BUS DESTINATIONS/ STATION
Northbound Coaches	Bukit KayuHitam, Changloon, Kangar, AlorStar,SungaiPetani, Kroh, Baling, Lenggong, Gerik, Penang, Butterworth, ParitBuntar, Kuala Kangsar, Taiping, IpohLumut, TelukIntan, Batu Gajah, Kuala Perlis , Padang Besar, Hadyai (Thailand).
Northeastbound Coaches	Kota Bahru, Jerteh& Kuala Besut, GuaMusang&Merapoh, Kuala Terengganu, Dungun, TasikKenyir .
Eastbound& Westbound Coaches	TasikChini, Kuantan, Lanchang, Karak, Raub, Kuala Lipis, Mentakab, Temerloh, Bentong, Fraser's Hill & Kuala KubuBaru, Genting Highlands, Cameron Highlands, Kuala Pilah, Jerantut.
Southbound Coaches	Melaka(Malacca), Seremban, Port Dickson, Kluang/Kota Tinggi, Johor Baru, Singapore, Mersing .
Coaches from Singapore	Bidor, Chemor, Genting Highlands, Gopeng, Grik, Ipoh, Jertih, Johor Baru / Senai Airport , Kampar , Kota Bahru, Kuala Kangsar, Kuala Lumpur, Lumut(PulauPangkor), Malacca(Melaka), Merang(Terengganu Islands), Mersing, Penang, Seremban, Taiping, TanjungMalim, Tapah, Terengganu.

Source : http://www.Malaysiasite.nl/busstationskleng.htm

2.2 Intercity Rail Transportation System

Rail transport in Malaysia is handled by a state enterprise named Keretapi Tanah Melayu Berhad (KTMB). The railway transportation has 3 major corridors: first, from Kuala Lumpur to the north -with the destination ending at the border town of Padang Besar; second, from Kuala Lumpur to the South- with the last destination at Johor Bahru; and third, from Kuala Lumpur to the East- with the destination ended at Tumpat. Although currently most of the rail network is still having a single track, there has been stretches built with double tracks and finally the northern and southern corridors will be double-track.

2.3 Air Transportation System

The main airport in Malaysia is the Kuala Lumpur International Airport (KLIA), managed and operated by Malaysia Airports Holdings Bhd, and located in Sepang which is about 55 km south of Kuala Lumpur. Before the opening of KLIA in 1998, Subang Airport served as the main Kuala Lumpur international airport. There are four other international airports, located in Langkawi, Kota Kinabalu, Kuching and Penang. In addition, there are 15 domestic airports: 10 in Peninsular Malaysia, and five in Sabah and four in Sarawak, which covers 15 destinations with Kuala Lumpur as the hub/center. The national airline is Malaysia Airlines which was incorporated in 1971. It services local destinations, as well as destinations in North America, South America, the Middle East, Africa, Europe, and Asia. Malaysia Airlines also has code-sharing arrangements with several airlines such as KLM Royal Dutch Airlines and Northwest Airlines, and operates a cargo division called MASKargo. The other major airline in Malaysia is Air Asia which operates as a low-cost carrier. Air Asia services destinations in Langkawi, Kuching, Kota Kinabalu and Labuan, flying from KLIA Low Cost Carrier Terminal (LCCT). Other airlines serving international and domestic destinations are Asean Airline, Pelangi Air, Firefly and Berjaya Air.

3. OVERALL DEMAND TRENDS OF INTERCITY PASSENGER TRANSPORT

3.1 Trend of travel demand for Intercity Bus

Based on the data from the Commercial Vehicles Licensing Board (CVLB) from 2009 and 2010, it can be observed that there was an increase of about 1.18 % for the total number of intercity bus demand. The total bus passenger demand in 2010 is 4,532,682.

3.2 Trend of travel demand for Intercity Rail

The passenger traffic demand for rail transportation from 2001 to 2007 has been derived from the data obtained from KTMB (Keretapi Tanah Melayu Berhad). It shows a decline in the number of passengers of around 2.11% from the year 2006 to 2007. The number of passengers taking the train during 2006 is 3,794,000 passengers. The details can be seen in Table 3.

3.3 Air Transportation Demand

The MAHB-statistic Annual Report 2009 reported that the domestic travel passenger movement for air transportation in Malaysia was around 28 million in the year 2009 (see Table 4). This represents an increase of about 7.3% as compared to the previous year. The KLIA handles about 30% of the domestic passenger movements followed by Kota Kinabalu and Kuching.

Table 2 **:** Intercity bus passengers in Malaysia

STATES	Year	
	2,009	2,010
Johor	659,102	648,590
Kedah	323,770	338,486
Kelantan	295,387	298,541
Melaka	92,506	97,762
Pahang	135,605	138,758
Perak	657,000	658,051
Perlis	6,307	6,307
Pulau Pinang	139,810	142,963
Selangor	382,637	400,507
Terengganu	110,376	115,632
w.p. kuala lumpur	1,674,562	1,685,074
TOTAL	4,479,070	4,532,682
GROWTH		1.18%

Source : Data Analysis from CVLB

Table 3 : KTMB Passengers in Malaysia

Year	Passenger	Freight (tonnes)
2001	5,511,000	4,150,000
2002	3,437,000	3,741,000
2003	3,362,000	4,608,000
2004	3,628,000	4,962,000
2005	3,675,000	4,031,000
2006	3,794,000	4,400,000
2007	3,714,000	4,669,800

Source :Keretapi Tanah Melayu Berhad (KTMB) Malaysia, years 1995 – 2007

4. MODAL COMPETITION AND SHARE OF DIFFERENT MODES.

The data used in this modal competition analysis is secondary data taken from KTMB Malaysia website for rail transport, and from MAHB Malaysia website for air transport. Meanwhile, for the intercity bus data, survey has been done in several intercity bus terminals. From the survey, some information regarding origin-destination, fare of each mode of intercity movement, travel time, access, and egress to the terminal can be derived and analyzed.

Table 4 : Passenger movement at MAHB airport

Airports	Arrival	Departure	Total
KLIA	5,044,578	4,952,233	9,996,811
Penang	921,785	929,712	1,851,497
Kota Kinabalu	1,848,377	1,858,939	3,707,316
Kuching	1,564,921	1,570,183	3,135,104
Langkawi	591,674	608,668	1,200,342
Kota Bahru	490,927	512,235	1,003,162
Ipoh	-	-	-
Kuala Terengganu	247,668	268,166	515,834
AlorSetar	208,578	212,736	421,314
Melaka	17	22	39
Subang	334,743	335,593	670,336
Kuantan	106,024	106,066	212,090
Tioman	15,288	15,546	30,834
Pangkor	3,623	3,994	7,617
Redang	9,556	10,785	20,341
Labuan	222,248	224,027	446,275
LahadDatu	49,162	49,396	98,558
Sandakan	328,413	332,080	660,493
Tawau	426,874	431,469	858,343
Bintulu	235,048	225,166	460,214
Miri	790,561	807,649	1,598,210
Sibu	458,688	468,336	927,024
Mulu	24,869	24,386	49,255
Limbang	23,060	22,452	45,512
STOL Sabah	-	-	-
STOL Serawak	69,075	75,248	144,323
Peninsular Malaysia	7,974,461	7,955,756	15,930,217
Sabah	2,875,074	2,895,911	5,770,985
Sarawak	3,166,222	3,193,420	6,359,642
Total 2009	14,015,757	14,045,087	28,060,844

Source : MAHB- ANNUAL REPORT statistic 2009

It may be argued that some important parameters can influence intercity bus preference, in line with Chieh et al (2007). It should also be remembered that service value declines with the decrease in service such as higher ticket prices or longer waiting time. This will reduce behavior intentions and will result in reduced numbers of passengers. This reflects the fact that monetary price is not the only influence on the behavior intentions of passengers. Some passengers are more concern about non-monetary price issues such as psychological and time costs rather than price. Most passengers do not like to have to spend a great deal of effort searching for passenger information.

Chieh et al (2007) also argue that, if in-vehicle-travel-time is also considered, customers may choose other intercity bus companies or alternative modes of transport with similar or better service quality but with a lower service sacrifice. Respondents' attitudes and perceptions towards transport modes may affect their preference and choices (Outwater et al. 2003, in Lang Yang et al 2009).

4.1 Competition of Intercity Transport departure frequency

Table 5 shows the frequency for intercity bus transport is much higher than air and rail transport. Some additional trip for intercity bus transport could be easily done compared to the rail or air transport, because of increase in demand particularly during peak period such as weekend, school holiday, festive season and public holiday. From interviews held on several respondents in the terminal, other than the common reason of fare price, travel time, access to the terminal and terminal facilities, the frequency of bus service in a day also become one of the considerations for some intercity travel passenger to choose the bus as their mode. Comparing to the rail, which only departs 3 times a day, intercity bus departure is more frequent, from every one hour to a maximum of 11 times a day for some destinations. In case of their unpunctuality, they can simply check the next trip of bus departure and take another bus.

For the air transport, the trip purpose is slightly different from those taking buses or trains. Air transport passengers are usually those who require short travel time for some valid reason such as business purpose. In many cases, businessmen usually travel a day before their business date. For some destinations, the departure time offered is also frequent.

Daily peak hours for intercity bus service are from 9 am to 12 noon and 8 pm to 10 pm. It is reasonable since the travel time to some destinations is around 6-8 hours for long distance, so the morning departure session will reach the destination in the evening while the night departure session will reach before daylight.

Table 5 : Intercity modal departure frequency/day

Destination	**Frequency**		
	plane	bus	rail
Penang	17	40	3
Ipoh	-	48	8
Kota Bharu	10	60	3
Kuala Terengganu	6	28	-
Kuantan	1	4	-
Johor Bahru	8	104	3
Melaka	-	24	-
AlorSetar	2	48	-
Total frequency	44	352	17

Source : Data Analysis Primary data

4.2 Competition of Intercity Transport Fare

From Table 6 below, the bus and train fares do not differ very much for a particular origin-destination pair. However, the fares for bus and train do differ significantly with that of air transport.

Table 6 :Competition of intercity transport fare

Origin - destination		Bus			Rail			Air		Auto mobile
		1st Class	2nd Class	3rd Class	1st Class	2nd Class	3rd Class	1st Class	2nd Class	
Kuala Lumpur	Penang	$ 17.2	$ 12.0	$ 8.8	$ 15.2	$ 11.0		$ 71.6	$ 30.5	$ 17.4
	Ipoh		$ 6.5	$ 3.9	$ 13.0	$ 9.7	$ 7.1			$ 10.8
	Kota Bharu	$ 13.0	$ 11.3	$ 8.7	$ 13.4			$ 54.5	$ 35.3	$ 23.5
	Kuala Terengganu	$ 14.6	$ 13.3	$ 9.7				$ 44.1	$ 37.9	$ 22.4
	Kuantan		$ 8.4	$ 5.5				$117.4	$ 52.0	$ 13.1
	Johor Bahru	$ 13.6	$ 10.1	$ 8.4	$ 38.9	$ 12.3	$ 10.7	$ 44.1	$ 37.9	$ 17.6
	Melaka		$ 4.9	$ 3.9						$ 7.8
	AlorSetar	$ 13.9	$ 13.3	$ 12.3	$ 15.6	$ 7.8		$130.0		$ 19.3

4.3 Competition of Intercity Transport Travel Time

Travel time is one of the most important reasons why people prefer intercity bus rather than train. In one interview session, respondents claim that train travel time is too long, which make the users feel uncomfortable in the train. However, there are some train passengers who will book sleeping coach, so that they can enjoy taking a rest and slumber during the trip.

Table 7 shows estimates for travel time for some origin-destination served by the different intercity transport modes. If high speed train is operated in Malaysia, with 300 km/hour operating speed, travel time from KL to the north and south will be significantly reduced.

Travel time difference between intercity land transport and air transport is very large. However, the travel purpose, type of activities and level of income of the passengers are slightly different between intercity bus/train and plane.

Table 7: Competition of intercity transport travel time

Origin - destination		Bus			Rail	Air	Automobile
		1st Class	2nd Class	3rd Class			
Kuala Lumpur	Penang	5.0	5.5	6.5	8.5	0.8	3.3
	Ipoh	2.5			3.5		2.0
	Kota Bharu	8.0	8.5		10.0	1.0	4.4
	Kuala Terengganu	8.0				0.9	4.2
	Kuantan	3.5				0.7	2.5
	Johor Bahru	5.0	5.0		8.0	0.9	3.3
	Melaka	3.0					1.5
	AlorSetar	7.0	5.0		10.0	1.1	3.6

Source : MAHB Malaysia, KTMB Malaysia and primary data on intercity bus terminal

4.4 Competition of Intercity Transport Accessibility

Another important factor in determining the intercity mode is the accessibility to the intercity transport facility. Sometimes intercity passengers are doubtful to choose certain mode because of its poor access to the station or terminal by public transport. For intercity movement in Malaysia,

train offer the better access to intercity passenger who lives around Kuala Lumpur to go to its station, comparing to the access to any intercity bus terminal. It is because the intercity train station is located in the central part of Kuala Lumpur. Crisalli (1999) argued that, feeder transport service to the intercity terminal also affect the intercity traveler in choosing the intercity transport mode choice. A large segment of respondents (83.33%) argued that feeder service is important for them in deciding what intercity mode to be chosen.

In Table 8, several parameters are used to evaluate the accessibility of the passenger to the terminal (i.e., distance, travel time, and fare). The table shows that the value of the parameter of distance, travel time and fare of train is lower than the bus. This means that rail transport is more accessible than bus.

Accessibility factor should be favorably considered in any planning of intercity public transport terminals. The new under-construction integrated intercity bus terminal in Bandar Tasik Selatan and Gombak should be equipped with better public facility related to feeder transport service. Competition between intercity transportation mode facilities accessibility can be seen in Table 8. Public transport feeder fare to intercity bus terminal is almost 2 times higher than to intercity train station. Moreover, for intercity bus terminal on Duta Street is only served by private car or taxi, and no other option. As a result, if bus passengers arrived at the Duta bus terminal at 6 pm or 6 am, and take taxi as the feeder transport, it will cost as much as intercity bus fare price itself.

4.5 Competition of Intercity Transport Egress

The transport egress is indicated by its accessibility for passengers from the destination terminal to proceed towards their home or other places. Egress at destination for intercity passengers have the same situation on each destination, namely, public transport service is not so good. However, in most cases where the arrival time of intercity passengers is before dawn, there is no public transport available at that time except they have to choose taxi or must be picked up by someone.

Table 8 :Competition in intercity transportation accessibility

Intercity Mode	Mode	Distance (km.)	Time (min.)	Fare (USD)
Bus	Car	8	14	$ 0.22
	City Bus + LRT	15	45	$ 1.90
	Taxi	8	14	$ 3.89
Rail	Car	4.5	10	$ 0.12
	City Bus + LRT	5.2	25	$ 0.84
	Metro Bus + walking	10	45	$ 0.32
	Taxi	4.5	10	$ 2.59
Air	Car	50	45	$ 1.36
	Car + Bus link	54.5	70	$ 4.31
	City Bus + LRT + Bus Link	55.2	85	$ 3.76
	Taxi + Bus Link	54.5	105	$ 5.51
	Taxi	50	45	$ 16.21

Table 9: Egress at destination

Destination	Intecity Public Transport	Mode	Distance (km.)	Time (min.)	Fare (USD)
Penang	Bus	Car	8	15	$ 0.43
		City Bus	10	20	$ 0.73
		Taxi	8	12	$ 2.62
	Rail	Car	5	5	$ 0.27
		Taxi	5	5	$ 2.62
	Air	Car	30	60	$ 0.43
		Bus	30	75	$ 3.30
		Taxi	30	60	$ 26.20
Ipoh	Bus	Car	8	15	$ 0.43
		City Bus	8	20	$ 0.80
		Taxi	8	12	$ 2.62
	Rail	Car	8	15	$ 0.43
		City Bus	8	20	$ 0.80
		Taxi	8	15	$ 2.62
Kota Bharu	Bus	Car	8	15	$ 0.43
		Taxi	8	15	$ 2.62
	Rail	Car	8	15	$ 0.43
		City Bus	8	20	$ 0.80
		Taxi	8	15	$ 2.62
	Air	Car	10	20	$ 0.55
		Bus	10	30	$ 3.30
		Taxi	10	20	$ 3.20
Kuala Terengganu	Bus	Car	8	15	$ 0.43
		City Bus	8	20	$ 0.80
		Taxi	8	15	$ 2.62
	Air	Car	10	20	$ 0.55
		Taxi	10	20	$ 3.20
Kuantan	Bus	Car	8	15	$ 0.43
		City Bus	8	20	$ 0.80
		Taxi	8	15	$ 2.62
	Air	Car	15	30	$ 0.79
		Taxi	15	30	$ 4.10
Johor Bahru	Bus	Car	8	15	$ 0.43
		City Bus	8	20	$ 0.80
		Taxi	8	15	$ 3.20
	Rail	Car	10	20	$ 0.53
		City Bus	10	30	$ 0.82
		Taxi	10	20	$ 3.90
	Air	Car	25	35	$ 1.33
		Taxi	25	30	$ 16.40
Melaka	Bus	Car	8	12	$ 0.43
		City Bus	8	15	$ 0.80
		Taxi	8	12	$ 3.20
AlorSetar	Bus	Car	8	12	$ 0.43
		Taxi	8	12	$ 2.62
	Rail	Car	8	12	$ 0.43
		Taxi	8	12	$ 2.62
	Air	Car	12	15	$ 0.63
		Taxi	12	15	$ 3.90

5. CONCLUSION

The high departure frequency of intercity bus in a day is one of the most important reasons why most of intercity passengers prefer to travel by bus than train. The high frequency of the intercity buses eliminates the risk of their unpunctuality as compared to train. So the passengers have

another choice if they somehow miss the bus, they can purchase another ticket for the next trip with reasonable price. This is more flexible than train which only departs 3 times a day.

Although air transport frequency is quite high and offer the shortest travel time, however some other factors also have to be considered by the users. These include fare price, and accessibility to the terminal. The long travel time of train made it not as popular as bus. Passenger feels uncomfortable being inside the train for a long time. Therefore many intercity passengers choose intercity bus as it has shorter travel time than train. Some people also prefer train with the sleeping coach facility.

The accessibility to the bus terminal in Malaysia is lower than the train accessibility because the position of train station is usually in the center of the city. If a high speed train were to be introduced in Malaysia there is a likelihood that a significant shift from other modes to the high speed intercity train will occur.

Egress service at the destination for intercity train and intercity bus are quite similar. The final destination of intercity travel for buses and trains is usually a small city, so the accessibility to the intercity terminal or station for both modes will be not so different. On the other hand, the egress service to the airport in Malaysia is worse than bus or train, because the airport location is far from city centre.

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